A.2.3 Ultraviolet, Visible, and Gravitational Astrophysics Program

1. Scope of Program

This program element solicits basic research proposals to conduct investigations that are relevant to the NASA Ultraviolet (UV), Visible, and Gravitational Astrophysics (UVGA) program. There are two primary goals: to obtain a better understanding of astrophysical objects and phenomena as revealed through their ultraviolet and visible radiation (over the range of roughly 100 Angstroms to H-alpha), and to investigate topics in general relativistic and gravitational astrophysics. Proposed research may include observational topics (note limitations described below), as well as experimental laboratory astrophysics, provided that such studies pertain directly to NASA UV, visible, and gravitational astrophysics related space missions. Supporting technology studies and laboratory facilities of importance to the future of UV/Visible flight programs are also included within the scope of this program. While excellence of proposed research is the primary selection criterion, relevance to NASA missions is of nearly equal weight and must be explicitly described in the proposal. A list of past, present, and future missions of interest is given in Table 1, which is furnished only as a guide to assessing relevance of proposals for this program element.

Topics of interest to this NRA fall into the following four research categories listed here in priority order as set by the NASA UVGA Program Working Group:

- *Supporting ultraviolet technology studies* - for example, UV photocathodes, ultra-light holographic grating development, thin films in the EUV, lightweight composite mirrors;
- *Laboratory ultraviolet astrophysics* - for example, predissociation in diatomic molecules, electron-ion collisions, compilation of transition probability data, measurement of absolute oscillator strengths for UV transitions, UV characteristics for polycyclic aromatic hydrocarbons;
- *General relativity and physics of gravitation* - for example, lunar-laser ranging tests of relativity, solar-system tests of gravitational theories using satellite data, low frequency gravitational wave astronomy; and
- *Ground-based astronomy* - for example, optical imaging and spectroscopy of the Ultraviolet Imaging Telescope fields, calibration of supergiants for the Hubble Space Telescope.

Proposals for ground-based observations will be considered only if (a) they are in direct support of NASA UV/Visible related missions (for example, see Table 1 below in this section), and (b) the proposers are ineligible, by virtue of their institutional affiliation, to receive direct or indirect support from the National Science Foundation for ground-based astronomy.

Table 1 - Past, Current, and Future Missions Relevant to the UV, Visible, and Gravitational Astrophysics Research and Analysis Program

(Note: Links to mission home pages may be found through the World Wide Web URL <http://www.hq.nasa.gov/office/oss/missions/index.htm.>)

MISSION	LAUNCH YEAR	REMARKS
• International Ultraviolet Explorer (IUE) 1200–3200Å	1978	Terminated in 1996.
• Hipparcos	1989	ESA astrometry mission.
• Hubble Space Telescope (HST)	1990	In operation.
Goddard High Resolution Spectrograph (GHRS) 1150–8000Å		Ceased operation.
Faint Object Camera (FOC) 1150–6500Å		In operation.
Faint Object Spectrograph (FOS) 1050–3200Å		Ceased operation.
Wide Field/Planetary Camera 2 (WF/PC2) 1150–11000Å		In operation.
Space Telescope Imaging Spectrograph (STIS) 1150–11000Å		In operation.
• Astro-1	1990	Completed 9 day mission.
• Astro-2 400 – 3000 Å *Hopkins Ultraviolet Telescope (HUT)* *Ultraviolet Imaging Telescope (UIT)* *Wisconsin UV Photopolarimeter Experiment (WUPPE)*	1995	Completed 16 day mission.
• Extreme Ultraviolet Explorer (EUVE) 80–800Å	1992	In operation, Guest Observer program.
• Orbiting and Retrievable Far and Extreme Ultraviolet Spectrometer (ORFEUS)/ Interstellar Medium Absorption Profile Spectrograph (IMAPS) 400–1200Å	1993	Completed 5 day mission.
• ORFEUS II / MAPS	1996	Completed 13 day mission.
• On-going tests of relativity	—	Various current interplanetary spacecraft.
• Far Ultraviolet Spectroscopic Explorer (FUSE) 800–1200Å	1998	3 year mission.
• HST Advanced Camera for Surveys (ACS)	1999	HST replacement instrument.
• Gravity Probe-B (GP-B) - Lense Thirring Effect	2000	2 year mission.
• The Galaxy Evolution Explorer (GALEX) 1350 – 3000Å	2001	28 month mission.
• Cosmic Origins Spectrograph (COS)	2002	HST replacement instrument.
• Space Interferometry Mission (SIM)	TBD	Selected for study.

2. Programmatic Information

It is expected that roughly $1M will be available in FY 1999 for the funding of about 20 new three-year projects split among four categories: supporting UV technology, laboratory UV/Visible astrophysics, gravitation and general relativity, and ground-based astronomy.

Proposers are encouraged to define a program that may be accomplished in a three-year period. It is recognized that the proposed investigation may evolve with time. Accordingly, emphasis should be placed upon the first year's effort, with as much detail as possible provided relevant to the planned second and third year's activities. Proposals for investigations requiring less than a three-year time scale to complete are also acceptable, as are those which require a longer time scale to complete, though the latter must undergo peer review after three years. Key projected milestones and accomplishments during each period of the proposed effort should be identified.

The schedules for submission of the Notice of Intent and proposal are given in Table 1 of the cover letter of this NRA. The World Wide Web site for submitting both the NOI and the *Cover Page/Proposal Summary* (see Appendix C.5.3) is <http://props.oss.hq.nasa.gov>; proposers without access to the Web or who experience difficulty in using this site may contact Ms. Debra Tripp (E-mail: deb.tripp@hq.nasa.gov) for assistance. Hard copies of the proposals are to be delivered to:

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